CLAIMS

1. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor; and

periodically reexecuting said calibration after the head is loaded.

2. A method according to claim 1, wherein after the head is loaded, the carriage is periodically moved to an inner-periphery stopper position to reexecute

said calibration.

3. A method according to claim 1, wherein after the head is loaded, unloading is periodically performed and the carriage is moved to an outer-periphery stopper position to reexecute said calibration, and reloading is performed after the reexecution.

4. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor; and

if it is detected that a change in a temperature of the voice coil motor or an ambient temperature thereof from a temperature during loading is not less than a prescribed value after the head is loaded, reexecuting said calibration.

5. A method according to claim 4, wherein if the temperature change is not less than the prescribed value after the head is loaded, the carriage is moved to an inner-periphery stopper position to reexecute said calibration.

6. A method according to claim 4, wherein if the temperature change is not less than the prescribed value after the head is loaded, unloading is performed and the carriage is moved to an outer-periphery stopper position to reexecute said calibration, and reloading is performed after the reexecution.

7. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk,

calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor;

reading out the voice coil motor velocity detection value immediately after loading control is switched to on-track control from the voice coil motor velocity detection circuit and storing the readout value in a memory; and

monitoring the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit while the head is positioned on the disk and, if an absolute value of a difference between the monitored voice coil motor velocity detection value and the voice coil motor velocity detection value stored in said memory is not less than a prescribed value, reexecuting said calibration.

8. A method according to claim 7, wherein if the absolute value of the difference between the monitored voice coil motor velocity detection value and the voice coil motor velocity detection value stored in said

memory is not less than the prescribed value, the carriage is moved to an inner-periphery stopper position to reexecute said calibration.

9. A method according to claim 7, wherein if the absolute value of the difference between the monitored voice coil motor velocity detection value and the voice coil motor velocity detection value stored in said memory is not less than the prescribed value, unloading is performed and the carriage is moved to an outer-periphery stopper position to reexecute said calibration, and reloading is performed after the reexecution.

10. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor

velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor; and

if a predetermined time has elapsed since the head is loaded when an unload instruction is received, reexecuting said calibration and performing unloading thereafter.

11. A method according to claim 10, wherein the carriage is moved to an inner-periphery stopper position to reexecute said calibration when the unload instruction is received.

12. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through

the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor; and

if a change in a temperature of the voice coil motor or an ambient temperature thereof from the temperature during loading is not less than a prescribed value when an unload instruction is received, reexecuting said calibration and performing unloading thereafter.

13. A method according to claim 12, wherein the carriage is moved to an inner-periphery stopper position to reexecute said calibration when the unload instruction is received.

14. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor;

reading out the voice coil motor velocity detection value immediately after loading control is switched to on-track control from the voice coil motor velocity detection circuit and storing the readout value in a memory; and

monitoring the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit when an unload instruction is received and, if an absolute value of a difference between the monitored voice coil motor velocity detection value and the voice coil motor velocity detection value stored in said memory is not less than a prescribed value, reexecuting said calibration and performing unloading thereafter.

15. A method according to claim 14, wherein the

carriage is moved to an inner-periphery stopper position to reexecute said calibration when the unload instruction is received.

16. A calibration method for use in a head loading/unloading type disk apparatus having a voice coil motor for driving a carriage to move a head in a direction of radius of a disk, a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor, and a ramp mechanism arranged outside an outer periphery of the disk to retract the head, comprising the steps of:

executing, at the start of loading control for loading the head from the ramp mechanism onto the disk, calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor;

when an unload instruction is received, performing unloading by using a result of said calibration during loading; and

if the unloading indicates abnormality, moving the carriage to an inner-periphery stopper position, reexecute said calibration, and again performing unloading by using a result of the reexecuted calibration.

17. A head loading/unloading type disk apparatus comprising:

a voice coil motor for driving a carriage to move a head in a direction of radius of a disk;

a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor;

a ramp mechanism arranged outside an outer periphery of the disk to retract the head;

a timer for measuring time; and

a controller for, at the start of loading control for loading the head from the ramp mechanism onto the disk, initializing and activating said timer and executing calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and

a current is supplied to the voice coil motor, and, after loading the head, monitoring said timer, reexecuting said calibration if a value of said timer is not less than a prescribed time, and initializing and reactivating said timer.

18. A head loading/unloading type disk apparatus comprising:

a voice coil motor for driving a carriage to move a head in a direction of radius of a disk;

a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor;

a ramp mechanism arranged outside an outer periphery of the disk to retract the head;

a temperature sensor for measuring a temperature of the voice coil motor or an ambient temperature thereof;

a memory; and

a controller for, at the start of loading control for loading the head from the ramp mechanism onto the disk, reading out a measurement temperature of said temperature sensor, storing the readout temperature in said memory, and executing calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said

calibration being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor, and, after loading the head, monitoring the measurement temperature of said temperature sensor, and reexecuting said calibration if a temperature change from the measurement temperature during loading stored in said memory is not less than a prescribed value.

19. A head loading/unloading type disk apparatus comprising:

a voice coil motor for driving a carriage to move a head in a direction of radius of a disk;

a voice coil motor velocity detection circuit for detecting a voice coil motor velocity corresponding to a back electromotive force of the voice coil motor;

a ramp mechanism arranged outside an outer periphery of the disk to retract the head;

a memory; and

a controller for, at the start of loading control for loading the head from the ramp mechanism onto the disk, executing calibration for correcting a relationship between a value of a voice coil motor current flowing through the voice coil motor and the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit, said calibration

being executed by obtaining a voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit in a state where an actual velocity of the voice coil motor is set to zero and a current is supplied to the voice coil motor, and, immediately after switching from loading control to on-track control, reading out the voice coil motor velocity detection value from the voice coil motor velocity detection circuit and storing the readout value into said memory, monitoring the voice coil motor velocity detection value detected by the voice coil motor velocity detection circuit while the head is positioned on the disk, and reexecuting said calibration if an absolute value of a difference between the monitored voice coil motor velocity detection value and the voice coil motor velocity detection value stored in said memory is not less than a prescribed value.